DRAFT

ENGINEERING EVALUATION REPORT

Plant Name:	**KAISER PERMANENTE– RICHMOND**
Application Number:	**9827**
Plant Number:	**8679**

Background:

The applicant is applying for an Authority to Construct for two new IC engines to power a gas-fired cogeneration unit. The applicant is requesting an AC for the following equipment:

S-7	**I C Engine, Abated by**	**A-3**	**Catalytic Emission Control System**
S-8	**I C Engine, Abated by**	**A-4**	**Catalytic Emission Control System**

Background

The applicant is seeking an AC for two IC engines to power a cogeneration unit to provide electricity and hot water to the hospital. The proposed Tecogen CM-60 Cogenerqation Module is powered by two rich burn four-stroke natural gas-fired internal combustion engines, each rated at 0.798 MM BTU/hr (85 BHP). Each engine is abated by an internal Non-selective Catalytic Reduction (NSCR) Emission Control System to control criteria and toxic pollutants.

BACT/RACT Emission Calculations:

Under Regulation 2, Rule 2, any new source which results in an increase of criteria pollutants of more than 10 lb/day must be evaluated for adherence to BACT control technologies. The proposed engines do not emit more than 10 lb/day of criteria pollutants, and are therefore not subject to BACT considerations.

Screening:

A preliminary assessment of criteria and toxic pollutants emitted by the engines was performed to determine compliance with the District's Risk Management Policy. Using the emission factors from AP-42, Table 3-3.2 with an abatement factor representing 98% efficiency, the engines did not emit any pollutants exceeding the District's trigger levels. A summary of the toxic emission screening levels for the engines is summarized in Attachment 1.

Criteria Pollutant Emissions:

The two engines for the cogeneration units are described by their manufacturer as "4-stroke rich-burn" engines; however their thermal efficiency is actually 50%, resulting in criteria pollutant emissions closer to "lean-burn" engines (estimated as 35% efficiency for BACT determination). None of the engines emit more than 10 lb/day of any criteria pollutant. Because of the engines high thermal efficiencies, criteria emission limitations on the engines are based on the District's limitations for "lean-burn" engines rather than for "rich-burn" engines.

Criteria pollutants were calculated using the emission factors provided by the engine manufacturers and values from AP-42. For an 8760-hour per year permitted use they are as follows:

S#	RATING (MM BTU/HR)	PM* (lb/hr)	NOX** (lb/hr)	CO** (lb/hr)	TOC** (lb/hr)	SO2* (lb/hr)
g/bhp-hr		N/A	0.15	0.6	0.15	N/A
7	0.798	0.0001	0.03	0.11	0.03	0.0005
8	0.798	0.0001	0.03	0.11	0.03	0.0005
Total Lb/hr		0.0001	0.06	0.23	0.07	0.0009
Total lb/day		0.003	1.33	5.48	1.61	0.023
Total lb/yr		1.08	483.76	1999.26	588.61	8.22
TPY		0.001	0.242	1.000	0.294	0.004

* Emission factors from AP-42, Table 3.2-3

** Emission factors from manufacturer's data specifications

Compliance Determination:

These engines are covered under ministerial exemption, Chapter 2.3 of the BAAQMD Permit Handbook. CEQA is not triggered for small I C engines under this provision.

These engines are also governed by District Regulation 9, Rule 8, "Nitrogen Oxides and Carbon Monoxide from Stationary Internal Combustion Engines."

Conditions:

Condition #21661, setting out the operating conditions and recordkeeping requirements for combined operations at Sources S-7 and S-8 shall be made part of the sources' authority to construct.

Recommendation:

I recommend that an Authority to Construct be issued for the following sources:

S-7 IC Engine, General Motors Industrial/TecoDrive 7400, 85 BHP, abated by A-3 Tecogen NSCR Catalytic Emission Control System

S-8 IC Engine, General Motors Industrial/TecoDrive 7400, 85 BHP, abated by A-4 Tecogen NSCR Catalytic Emission Control System

subject to Condition #21661.

By _____ **Date** _____
PSD Evaluator

COND# 21661 ----------

1. Sources S-7 and S-8, TecoDrive 7400 internal combustion engines shall be fueled solely by natural gas.

2. The permit holder shall maintain records of total monthly natural usage, and dates and times of such usage for each engine. Such records shall be retained for at least two years from date of entry and shall be made available to District staff upon request. [Reg 9-8-502]

ATTACHMENT 1

ALL EMISSIONS AFTER ABATEMENT

POLL	POLL NAME	CAS	BAAQMD Trigger (lb/yr)	Emission Factor lb/MMBTU	COGEN S-7 (lb/yr)	COGEN S-8 (lb/yr)	TOTAL EMISSIONS (lb/yr)	OVER BAAQMD TRIGGER?
41	Benzene	71-43-2	6.7	1.58E-03	2.21E-01	2.21E-01	4.42E-01	NO
60	Carbon tetrachloride	56-23-5	4.6	1.77E-05	2.47E-03	2.47E-03	4.95E-03	NO
124	Formaldehyde	50-00-0	33	2.05E-02	2.87E+00	2.87E+00	5.73E+00	NO
179	Methyl alcohol	67-56-1	120000	3.06E-03	4.28E-01	4.28E-01	8.56E-01	NO
182	1,1,2-trichloroethane	79-00-5	12	1.53E-05	2.14E-03	2.14E-03	4.28E-03	NO
263	Styrene	100-42-5	140000	1.19E-05	1.66E-03	1.66E-03	3.33E-03	NO
293	Toluene	108-88-3	39000	5.58E-04	7.80E-02	7.80E-02	1.56E-01	NO
307	Xylene	1330-20-7	58000	1.95E-04	2.73E-02	2.73E-02	5.45E-02	NO
314	1,1-Dichloroethane	75-34-3	120	1.13E-05	1.58E-03	1.58E-03	3.16E-03	NO
333	Ethyl benzene	100-41-4	190000	2.48E-05	3.47E-03	3.47E-03	6.93E-03	NO
335	Acetaldehyde	75-07-0	72	2.79E-03	3.90E-01	3.90E-01	7.80E-01	NO
386	Naphthalene	91-20-3	270	9.71E-05	1.36E-02	1.36E-02	2.72E-02	NO
390	Chloroform	67-66-3	36	1.37E-05	1.92E-03	1.92E-03	3.83E-03	NO
396	Methylene chloride	75-09-2	190	4.12E-05	5.76E-03	5.76E-03	1.15E-02	NO
420	Ethylene dibromide	106-93-4	2.7	2.13E-05	2.98E-03	2.98E-03	5.96E-03	NO
512	Acrolein	107-02-8	3.9	2.63E-03	3.68E-01	3.68E-01	7.35E-01	NO
518	Vinyl chloride	75-01-4	2.5	7.18E-06	1.00E-03	1.00E-03	2.01E-03	NO
520	Chlorobenzene	108-90-7	14000	1.29E-05	1.80E-03	1.80E-03	3.61E-03	NO
521	1,3-butadiene	106-99-0	1.1	6.63E-04	9.27E-02	9.27E-02	1.85E-01	NO
781	1,1,2,2-tetrachloroethane	79-34-5	3.3	2.53E-05	3.54E-03	3.54E-03	7.07E-03	NO

Emissions Factors from AP-42 3.2-3
& Manufacturer's Specifications